which appear not to have heretofore been described in connection with this question.

For instance: in the town of Schroeppel, Oswego County, N.Y., and extending across the Oneida River (outlet of Oneida Lake) for several miles into Clay, Onondaga County, there is a plain of much rolled and rounded bowlderets, cobbles, pebbles, gravel, and sand. Many of the stones, especially the larger ones, are composed of crystalline rocks from Canada. In the midst of the plain are numerous depressions, some of them containing one hundred acres or more. The deeper depressions are occupied by lakes without visible outlets, usually bordered by steep banks of sand or gravel up to seventy-five feet high. The smaller hollows present the well-known phenomenon of kettle-holes surrounded by reticulated kames, some of which are shown by excavations to have an anticlinal stratification. The coarser material is more abundant toward the north, and the sediments become finer in composition as we go south and south-eastward. At the same time the hollows become shallower, and the deposit expands somewhat in fan shape. Many of the shallower hollows contain swamps, once ponds, now peated over or filled with humus and silt often containing fresh-water shells. The plains of sand and gravel are bordered by broad plains of clay or silt. Some of the clays contain fresh-water shells; but my observations were made some years ago, and are not detailed enough to determine whether any of the fossiliferous clays are contemporaneous with the sand and gravel plains. Some of them are plainly later.

In Maine I have had opportunity to study scores of the deltas dropped by glacial rivers near where they entered the sea at a time it stood above its present level. They present the same proofs of a gradual stopping of the currents as are shown in the plain above described. The coarser fragments were first dropped as the rivers entered still water, and the assortment proceeded as their rate became slower, until at last the finest clay and rock-flour settled on the bottom of the water. The plain at the Oneida River has substantially the same structure as the deposits which I have described in Maine as deltas of glacial sediments: I therefore regard the plain as having been deposited by glacial rivers in still water in front of the ice, but not far from the ice-front. The assortment is more systematic, and takes place within less distance than is found in the frontal plain deposited in front of the ice on land sloping away from the glacier. This I regard as proof that the slopes of the land at that place were northward in glacial time, as they are at present. According to this interpretation, certain conclusions follow: 1. At a certain time the central part of the basin of Lake Ontario was still occupied by land-ice, which extended south to near the present Oneida River; 2. At this time south of the ice-front there was a body of open water, which at this place was fifteen or more miles wide; 3. The broad and deep sheets of gravel, sand, and clay which now cover the site of this open water are composed chiefly of the sediments of glacial rivers pouring from the north into still water, and dropping their burden.

If it be claimed that these sediments represent a sheet of glacial till which was eroded by the waves and re-deposited as aqueous sediment, then the material should grow finer as we go northward away from the Iroquois beach, whereas at the Oneida River we have the opposite arrangement. If it be claimed that these sediments were the result of wave-erosion of the solid rock, we have a right to demand that the system of beach-cliffs adequate to furnish so great a mass shall be pointed out to us. There are hundreds of square miles covered with sediments which in many places are known to be eighty or a hundred feet thick. The small amount of wave-erosion required to form the beach is in remarkable contrast with the scarp of erosion required by this theory. Moreover, any erosion hypothesis must assume a much greater erosion of the till than even the Atlantic was able to accomplish on the coast of Maine during its elevation in late glacial and post-glacial time. And if we suppose this drift to have its origin in any form of floating ice, how shall we account for the deep kettle-holes and reticulated ridges, or for the attrition which rounded the cobbles and bowlderets in tracts extending at right angles to the beach, or for the horizontal assortment of the sediments, they growing finer as we go south? I see no admissible theory except that above stated.

It would appear that any hypothesis of the marine origin of the Iroquois beach must concede that the central part of the basin of Lake Ontario was still covered by land-ice at the time when a body of water ten to thirty miles broad lay to the south of the ice-front. Into this body of water great glacial rivers flowed, so that it was practically a body of fresh water, even if at sea-level.

In addition to the delta plain above described, there are in the region other deposits that are probably glacial sediments, but I have not examined the country lying east of the plain in question so systematically as to be certain. If a line of frontal deltas can be traced eastward and westward, it will enable us to map the ice-front of that period. The relation of such a series to the Iroquois beach, especially in the country situated north and north-east of Watertown, would greatly help to decide the question whether the body of water that lay south of the ice was a lake or an arm of the sea.

G. H. STONE.

Colorado Springs, Col., Feb. 5.

Rain-Formation.

IN your issue of Feb. 6 Professor Hazen has produced a table whereby it is intended to show that "on an average more than half the rain at Pike's Peak occurs with a falling temperature;" and from subsequent remarks in his letter it appears that the professor hereby means to say that the surface air grew gradually colder while this rain was falling, at which, to him, extraordinary result he expresses his surprise.

To an ordinary individual it may not seem surprising if rainfall should have the effect of lowering the temperature of the surface-air, when it is considered that the raindrops descend from colder upper regions, and in all probability generally first appear as snow-flakes, and also, though not so much, that the clouds prevent the sun from keeping up the temperature of the surface-air; but I shall allow myself to point out that whether the downpour has the effect of changing the temperature of the surface-air or not, cannot possibly be ascertained from observations at Pike's Peak or any other isolated station.

Let us take the case before us of rain having fallen at Pike's Peak for ten hours with a falling thermometer, and that the wind was blowing during that time at a rate of about twenty miles an hour. The surface-air which during the ten hours passes the station at Pike's Peak will then represent a body of air two hundred miles long; and when the rain set in it may have been located on lower land. The eleven readings of the thermometer give us, therefore, the temperature of air-bodies located at distances of twenty miles from one another, and taken, not all at the same moment, but at eleven different hours; and I should feel obliged to Professor Hazen if he would explain how it is possible to deduce from these readings whether the surface-air as such grew colder or warmer during the fall of rain.

It is probably from drawing inferences of this nature that the professor arrives at such apparent anomalies as when he makes the following amazing statement: "While it might be thought that a falling temperature in a saturated air would tend to produce rainfall, such is by no means the fact. There are many cases in which a fall of from ten to fifteen degrees of Fahrenheit has occurred in saturated air without any corresponding rainfall." Here is really no anomaly. The air which passed the place of observation was all saturated, and the air which came first had a temperature ten to fifteen degrees higher than the temperature of the air which afterwards passed by; but Professor Hazen infers that it was the same air he was examining all the time, and consequently wonders why it wouldn't rain when saturated air "got chilled."

FRANZ A. VELSCHOW, C.E.

Brooklyn, N.Y., Feb. 13.

BOOK-REVIEWS.

Social Diseases and Worse Remedies. By T. H. HUXLEY. New York, Macmillan. 16°. 30 cents.

THIS pamphlet contains a series of letters published a few weeks since in the London *Times*, criticising quite severely the scheme for relieving poverty devised by Mr. Booth, the "general" of the Salvation Army. In his first letter Mr. Huxley condemned the

scheme, partly because of its socialistic character, but mainly because in his opinion the Salvation Army was liable to degenerate into "a mere engine of fanatical intolerance and personal ambition." The publication of this letter, however, brought him a large amount of new information, some of it coming from persons that had been officers of the Salvation Army, and all tending to show that his apprehensions were amply justified. It appears that the officers are all under obligation, like the Jesuits, to "'obey, without questioning or gainsaying, the orders from headquarters;'" and it further appears from evidence that has not been questioned that large sums of money and other property originally contributed by the public have been "handed over to Mr. Booth and his heirs and assigns." This property is ostensibly held in trust, but Mr. Huxley shows that there is no legal obligation to that effect. He also criticises some of Mr. Booth's social theories, remarking that "with thrift and self-respect denounced as sin, with the suffering of starving men referred to the sins of the capitalist, the Gospel according to Mr. Booth may save souls, but it will hardly save society."

The result is, that Mr. Booth's schemes are unqualifiedly condemned, while at the same time the author of the letters shows that he realizes the misery of the poor, and the danger it threatens to society, as fully as any one. Indeed, he seems to us to exaggerate the social danger, remarking that "unless this remediable misery is effectually dealt with, the hordes of vice and pauperism will destroy modern civilization as effectually as uncivilized tribes of another kind destroyed the great social organization which preceded ours." He also reprints an essay published in a magazine in 1888, in which he takes a very pessimistic view of the problem of poverty; but the only remedy he proposes is technical education, which to our mind is altogether inadequate. The whole pamphlet, however, is very interesting, and should be read by every one who is concerned for the welfare of the laboring poor.

AMONG THE PUBLISHERS.

THE American Academy of Political and Social Science will shortly issue a translation of Professor Meitzen's work on statistics. English literature on this subject is so meagre, that every one interested either in its theoretical or practical aspects will be glad to learn of this accession to our stock of scientific material. Dr. R. P. Falkner of the University of Pennsylvania has made the translation.

— "Therapeutic Sarcognomy: a New Science of Soul, Brain, and Body," is the title of a forthcoming work from the house of the J. G. Cupples Company, Boston. The author is Professor J. R. Buchanan.

— In the *Illustrated American* for the week ending Feb. 21 there are illustrations of some of the treasures, in the way of old books and bric-a-brac, that are contained in the collection of Mr. Brayton Ives, about to be sold.

— "Liberty in Literature" is the title of a small volume, well printed and neatly bound, recently published by the Truth-Seeker Company of this city. It is an address delivered by Robert G. Ingersoll at Horticultural Hall, Philadelphia, on Oct. 21, 1890, on the occasion of a testimonial to Walt Whitman. A portrait of the aged "good gray poet" illustrates the volume.

— N. D. C. Hodges, 47 Lafayette Place, New York, has now in press a work by Dr. Daniel G. Brinton, entitled "The American Race: a Linguistic Classification and Ethnographic Description of the Native Tribes of North and South America." It is the first attempt ever made to classify all the Indian tribes by their languages, and it also treats of their customs, religions, physical traits, arts, antiquities, and traditions. The work comprises the results of several years of study in this special field.

— Professor Morey of Rochester University, the author of "Roman Law," has submitted a paper to the American Academy of Political and Social Science on "The Genesis of our Written Constitutions," which will shortly be issued by that body. He attempts to show, that, so far from Mr. Gladstone's famous words relating to the origin of the Constitution of the United States being true, that instrument was a legitimate development of the Constitution of the Colonies then existing, which in their turn had grown out of the charters of the old trading-companies.

—"The Harpur Euclid," just published by Rivington of London, and Longmans, Green, & Co., of New York, is an edition of Euclid's "Elements" revised in accordance with the reports of the Cambridge Board of Mathematical Studies and the Oxford Board of the Faculty of Natural Science. It is the joint production of Edward M. Langley, M.A., and W. Seys Phillips, M.A. The work is intended to be strictly a school edition of Euclid. While retaining his sequence of propositions, and basing their proofs entirely on his axioms, the editors have not scrupled to replace some of his demonstrations by easier ones, and to discard whatever they considered superfluous or unnecessary. A good feature of the miscellaneous exercises given in the volume is that they are taken from widely different sources; some being original, others taken from examination-papers, and still others being well-known theorems or problems given by most writers on the same subject.

— The late work of Henry M. Howe (son of Julia Ward Howe) on "The Metallurgy of Steel" has met with pronounced success. It has been warmly commended by many of the scientific journals of Europe. We quote some of their opinions: "This work promises to become a classic. With a lucid style it combines thorough comprehension of the subject and a wise conciseness," says the *Colliery Guardian*, London. Other authoritative opinions are as follows: "It is not only the most beautiful book ever published about steel, but certainly, also, the most complete and profound" (*Revue Universelle des Mines*, Liege, Belgium). "We fully indorse and recommend it to the German metallurgists as one of the most important contributions in modern times to the siderometallurgial science" (*Berg-und Huettenmaennische Zeitung*, Berlin, Germany). "This stately quarto is the most exhaustive yet written on the subject" (Professor Ledebar, Freiberg, Germany). "It is so easily and so far in advance of any thing that has ever been published on iron, that it marks an epoch in the literature of the subject" (Professor Drown, Institute of Technology, Boston).

— In the *Atlantic* for March, in an autobiographic fragment entitled "My Schooling," we are told of James Freeman Clarke's early educational training. "The State University in America," by George E. Howard, advocates the establishment of universities in each State, which shall be universities in something more than name, and the relegation of the many colleges of insufficient means to a grade intermediate between the school and the university. A paper on "The Speaker as Premier," by Albert Bushnell Hart, is a timely consideration of a question which has been much before the public of late. Mr. Lowell continues his articles on travel in Japan. Perhaps the most valuable contribution to the number is Francis Parkman's first paper on the "Capture of Louisbourg by the New England Militia," an historical study of much importance, and with an incidental sketch of the Wentworth House, at New Castle, Maine, which is very charming. Miss Agnes Repplier, in an amusing and thoughtful paper called "Pleasure: A Heresy," appeals, not for more cultivation in life, but for a recognized habit of enjoyment. The article is full of good-natured banter at the expense of the self-consciously cultivated persons, who demand from both literature and art, not pleasure, but some serious moral purpose.

— Mark Brickell Kerr, topographer of the National Geographic Society's expedition to Mount St. Elias in the summer of 1890, will describe the adventures and discoveries of that exploration in the March *Scribner*. The results of his study of glaciers are especially valuable, as well as the determination of a new measurement for the altitude of this famous Alaskan mountain. Samuel Parsons, jun., superintendent of parks for New York City, who has done so much to beautify the public fountains with rare water-lilies, papyrus, and lotus, will describe the practical means of ornamenting ponds and lakes in the same number. This article will especially interest people with small places in the country, having natural streams and ponds upon them.

— In *The Chautauquan* for March, 1891, we note the following contributions: "The Intellectual Development of the English